

**QUIZ NAVIGATION**

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✓		✓		✓
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Started on	Friday, 11 October 2024, 7:05 PM
State	Finished
Completed on	Friday, 11 October 2024, 7:08 PM
Time taken	3 mins 14 secs
Grade	7.00 out of 10.00 (70%)

**Question 1**

ID: 38041

Correct

Flag question

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**THE NEXT 6 QUESTIONS INCLUSIVE REFER TO THE FOLLOWING CASE:**

RS is a 22-year-old male who presents to your clinic with a chief complaint of personality changes over the past 6 months. RS weight 68kg and was born with a low birth weight. His girlfriend reports that he has shown a lack of interest lately, especially in activities that he used to enjoy. He has been having difficulty focusing on his work at the factory which has resulted in him being written up for negligence twice by his supervisor in the past month. RS has also been suspicious of his parents and believes that they are plotting against him for a life insurance claim. He has since moved out of his home and moved in with his girlfriend. RS does not have any other diagnoses and does not take any prescription medications. He admits to using cocaine 4 - 5 times per week with his girlfriend and eating fast food daily. RS's physician has diagnosed him with schizophrenia. RS's father was also diagnosed with schizophrenia when he was 27.

**Laboratory Parameters**

Parameter	Value
Blood pressure	138/94 mmHg
Pulse	70 bpm
HbA1c	5.4 % (4-5.6%)
LDL-C	1.6 mmol/L (<2.6mmol/L)
HDL-C	1.8 mmol/L ( $\geq$ 1mmol/L)
Triglycerides	1.4 mmol/L (<1.1mmol/L)

All of the following are risk factors for RS developing schizophrenia **EXCEPT:**

Select one:

- Low birth weight ✗
- Substance abuse ✗
- Unhealthy diet ✓
- Genetics ✗

Rose Wang (ID:113212) this answer is correct. An unhealthy diet is not a risk factor for the development of schizophrenia.

**Correct**

Marks for this submission: 1.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To recognize the risk factors for the development of schizophrenia.

**BACKGROUND:**

Schizophrenia symptoms include positive and negative symptoms as well as cognitive and mood symptoms.

Risk factors for the development of schizophrenia include

- Low birth weight
- Genetics
- Advanced age
- Substance abuse
- Maternal factors (e.g., obesity, malnutrition, among others)

Many street drugs can lead to or worsen psychosis symptoms

- Cocaine
- LSD
- Methamphetamine

- Marijuana
- Ecstasy
- PCP
- Ketamine
- Anticholinergics
- Dopamine agonists
- Levodopa

**RATIONALE:**

*Correct Answer:*

**(Option #3):** An unhealthy diet is not a risk factor for the development of schizophrenia.

*Incorrect Answers:*

**(Option #1):** Low birth weight is a risk factor for the development of schizophrenia.

**(Option #2):** Substance abuse is a risk factor for the development of schizophrenia.

**(Option #4):** RS having a father diagnosed with schizophrenia increases the risk of developing schizophrenia.

**TAKEAWAY/KEY POINTS:**

Risk factors for the development of schizophrenia include low birth weight, genetics, advanced paternal age, maternal obesity, maternal malnutrition, and substance abuse.

**REFERENCE:**

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

[3] Procyshyn RM, Bechlibnyk-Butler KZ, Jeffries JJ (eds). Clinical Handbook of Psychotropic Drugs, 22nd Edition. Hogrefe Publishing, Toronto, 2017.

[4] Remington G, Addington D, Honer W, Ismail Z, Raedler T, Teehan M. Guidelines for the Pharmacotherapy of Schizophrenia in Adults. *Can J Psychiatry*. 2017;62(9):604-616. doi:10.1177/070674317720448

The correct answer is: Unhealthy diet

**Question 2**

ID: 38042

Incorrect

Flag question

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Which of the following options is the most appropriate non-pharmacological treatment for RS's schizophrenia?

Select one:

- Meditation therapy
- Motivational interviewing
- Electroconvulsive therapy
- Social skills training

*Rose Wang (ID:113212) this answer is incorrect. Meditation therapy is not the most appropriate non-pharmacological treatment for schizophrenia.*

**Incorrect**

Marks for this submission: 0.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To understand the non-pharmacological treatments for schizophrenia.

**BACKGROUND:**

Schizophrenia symptoms include positive and negative symptoms as well as cognitive and mood symptoms.

### Symptoms of Schizophrenia

Positive Symptoms	Negative Symptoms	Cognitive Symptoms	Mood Symptoms
<ul style="list-style-type: none"> <li>• Delusions</li> <li>• Hallucinations</li> <li>• Disorganization of speech, behavior, and thought</li> </ul>	<ul style="list-style-type: none"> <li>• Affective flattening</li> <li>• Apathy</li> <li>• Alogia</li> <li>• Anhedonia</li> <li>• Avolition</li> </ul>	<ul style="list-style-type: none"> <li>• Impaired attention</li> <li>• Impaired working memory</li> <li>• Impaired executive function</li> </ul>	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Anxiety</li> <li>• Aggression/hostility</li> <li>• Suicidality</li> </ul>

Non-pharmacological therapy for schizophrenia includes psychosocial rehabilitation which may include:

- Basic living skills
- Social skills training
- Basic education
- Work programs
- Supported housing

The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross-taper should be used. If there is an incomplete response then combination therapy can be considered. If treatment is resistant, then clozapine monotherapy can be considered. Therapy should be considered for at least 18 months post-remission or 2-5 years/lifelong therapy if there are multiple episodes.

## Pharmacological Treatments of Schizophrenia

Antipsychotic	Comments
Quetiapine	Second-line treatment for depression, may be abused for sedative and anxiolytic properties. Causes sexual dysfunction, postural hypotension, increased blood sugar, and sedation.
Risperidone	Has an IM injection that can be given q2weeks to improve compliance. Causes hyperprolactinemia and sexual dysfunction.
Paliperidone	Metabolite of risperidone, renal dose adjustments required, can be given IM q4weeks and q3months. Causes hyperprolactinemia.
Asenapine	BID dosing, should not eat or drink for minimum 10 minutes after administration, may have an unpleasant taste or cause tongue numbness/tingling. Causes QTc prolongation
Aripiprazole	No efficacy past 30 mg/daily, available as IM q4weeks. Well tolerated
Ziprasidone	BID dosing, give with food (minimum 500 calories), weight gain neutral, baseline QTc needed and stop medication is QTc > 500 msec
Lurasidone	Used for depressive episodes of bipolar disorder, give with food (minimum 350 calories), weight gain neutral. Well tolerated.
Olanzapine	Very sedating, increase blood sugar, increase lipids, sexual dysfunction, and negative metabolic effects. Available in short acting IM injection and oral dissolvable tab, large weight gain associated
Clozapine	Therapeutic superiority; however, only used for treatment resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, orthostatic hypotension, and seizures. Requires regular blood testing.

First-generation antipsychotics are all equally effective. Mid-potency antipsychotics such as loxapine, perphenazine, or zuclopentixol should be used.

Women with schizophrenia who are pregnant have an increased risk of stillbirth, infant death, prematurity, and infant being small for gestational age. The risks and benefits of antipsychotics need to be evaluated during pregnancy. There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

Neuroleptic malignant syndrome can occur with any antipsychotic. Symptoms of NMS include high fever, confusion, rigid muscle, sweating, and increased heart rate. Some symptoms can improve within 7 days such as agitation, hostility, combativeness, anxiety, and disrupted sleep; however, overall symptom improvement can take 4-6 weeks.

### RATIONALE:

Correct Answer:

**(Option #4):** Social skills training is the most appropriate non-pharmacological treatment for schizophrenia.

Incorrect Answers:

**(Option #1):** Meditation therapy is not the most appropriate non-pharmacological treatment for schizophrenia.

**(Option #2):** Motivational interviewing is not the most appropriate non-pharmacological treatment for schizophrenia.

**(Option #3):** Electroconvulsive therapy is not the most appropriate non-pharmacological treatment for schizophrenia.

### TAKEAWAY/KEY POINTS:

Non-pharmacological therapy for schizophrenia includes psychosocial rehabilitation which may include basic living skills, social skills training, basic education, work programs, and supported housing.

### REFERENCE:

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

[3] Procyshyn RM, Bezchlibnyk-Butler KZ, Jettrries JJ (eds). Clinical Handbook of Psychotropic Drugs, 22nd Edition. Hogrefe Publishing, Toronto, 2017.

[4] Remington G, Addington D, Honer W, Ismail Z, Raedler T, Teehan M. Guidelines for the Pharmacotherapy of Schizophrenia in Adults. *Can J Psychiatry*. 2017;62(9):604-616. doi:10.1177/070674317720448

The correct answer is: Social skills training

**Question 3**

ID: 38043

Correct

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**RS mentions to you that when his father was diagnosed with schizophrenia years ago, he was put on a drug that caused him to have involuntary movements in his arms. He describes the arm movements as looking like muscle spasms. He tells you that he does not want any medication that can cause that.**

Which of the following is the most appropriate treatment to start RS on for schizophrenia?

Select one:

Quetiapine ✓

Rose Wang (ID:113212) this answer is correct. Quetiapine is a first-line recommendation for the treatment of schizophrenia that has a lower incidence of extrapyramidal symptoms.

Haloperidol ✗

Clozapine ✗

Risperidone ✗

**Correct**

Marks for this submission: 1.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To understand the pharmacological treatments for schizophrenia.

**BACKGROUND:**

Dopamine blockade in the nigrostriatal pathway is associated with movement disorders that are classified as extrapyramidal symptoms (EPS). EPS are drug-induced movement disorders that are most commonly caused by typical (first-generation) antipsychotics compared with atypical (second-generation) antipsychotics because atypical antipsychotics have lower D2 receptor affinities. However, at high doses of atypical agents, the occurrence of EPS is the same as with typical agents. Therefore, EPS is a greater concern with first-generation antipsychotics and high doses of risperidone and paliperidone due to their greater activity on dopamine receptors. Brexpiprazole, clozapine, and quetiapine have not demonstrated a significant risk of extrapyramidal symptoms when compared to placebo in the existing literature. Below is a table that includes examples of EPS:

Extrapyramidal Symptom	Characteristics	Management
Dystonia	Involuntary muscle spasms Rapid onset: 24-96 hours from initiation or dose increase	IM or IV anticholinergics are first-line (e.g. benztrapine) Benzodiazepines are second-line (e.g. diazepam)
Akathisia	Motor restlessness Usually appears early in treatment	Decrease dose Switch to an antipsychotic with lower risk Benzodiazepines and beta-blockers (e.g. propranolol 160 mg)
Pseudoparkinsonism	Looks like Parkinson's disease (e.g. cogwheel rigidity, tremor, bradykinesia) Onset is within 1-2 weeks of initiation or dose increase, but can also present after months	Anticholinergics Amantadine
Tardive dyskinesia	Involuntary movements (e.g. lip smacking, tongue thrusting or frequent blinking) Late onset (months or years after medication use) Dyskinesia means "abnormal movements" Tardive means "delayed onset" A subtype of tardive dyskinesia is tardive dystonia where the patient experiences painful spasms.	Can be irreversible Early detection and discontinuation is important (however, tardive dyskinesia may initially worsen after lowering or discontinuing the antipsychotic)

**RATIONALE:**

Correct Answer:

**Option #1: Quetiapine is a first-line recommendation for the treatment of schizophrenia that has a lower incidence of extrapyramidal symptoms.**

**(Option #1):** Quetiapine is a first-line recommendation for the treatment of schizophrenia that has a lower incidence of extrapyramidal symptoms.

**Incorrect Answers:**

**(Option #2):** Haloperidol is a first-line recommendation for the treatment of schizophrenia, however, it has a higher incidence of extrapyramidal symptoms compared to quetiapine.

**(Option #3):** Clozapine is not a first-line recommendation for the treatment of schizophrenia.

**(Option #4):** Risperidone is a first-line recommendation for the treatment of schizophrenia, however, it has a higher incidence of extrapyramidal symptoms compared to quetiapine.

**TAKEAWAY/KEY POINTS:**

Second-generation (except for clozapine) and first-generation antipsychotics are considered first-line treatment options for schizophrenia. They differ in their side effect profiles, with second-generation antipsychotics causing more metabolic side effects and first-generation antipsychotics causing more extrapyramidal side effects. Quetiapine causes less extrapyramidal side effects than risperidone.

**REFERENCE:**

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

[3] Procyshyn RM, Bezchlibnyk-Butler KZ, Jeffries JJ (eds). Clinical Handbook of Psychotropic Drugs, 22nd Edition. Hogrefe Publishing, Toronto, 2017.

[4] Remington G, Addington D, Honer W, Ismail Z, Raedler T, Teehan M. Guidelines for the Pharmacotherapy of Schizophrenia in Adults. *Can J Psychiatry*. 2017;62(9):604-616. doi:10.1177/070674317720448

The correct answer is: Quetiapine

**Question 4**

ID: 38045

Incorrect

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**RS's physician decides that she would like to start him on ziprasidone therapy instead.**

Which test is suggested for RS to complete prior to starting ziprasidone?

Select one:

- Vision test ✕
- Chest x-ray ✕
- Electrocardiogram (ECG) ✓
- Glucose tolerance test ✕

Rose Wang (ID:113212) this answer is incorrect. A glucose tolerance test does not need to be done prior to starting ziprasidone.

**Incorrect**

Marks for this submission: 0.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To understand the side effects of ziprasidone.

**BACKGROUND:**

Schizophrenia symptoms include positive and negative symptoms as well as cognitive and mood symptoms.

## Symptoms of Schizophrenia

Positive Symptoms	Negative Symptoms	Cognitive Symptoms	Mood Symptoms
<ul style="list-style-type: none"><li>• Delusions</li><li>• Hallucinations</li><li>• Disorganization of speech, behavior, and thought</li></ul>	<ul style="list-style-type: none"><li>• Affective flattening</li><li>• Apathy</li><li>• Alogia</li><li>• Anhedonia</li><li>• Avolition</li></ul>	<ul style="list-style-type: none"><li>• Impaired attention</li><li>• Impaired working memory</li><li>• Impaired executive function</li></ul>	<ul style="list-style-type: none"><li>• Depression</li><li>• Anxiety</li><li>• Aggression/hostility</li><li>• Suicidality</li></ul>

The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross-taper should be used. If there is an incomplete response then combination therapy can be considered. If treatment is resistant, then clozapine monotherapy can be considered. Therapy should be considered for at least 18 months post-remission or 2-5 years/lifelong therapy if there are multiple episodes.

## Pharmacological Treatments of Schizophrenia

[Antipsychotic](#) [Comments](#)

Quetiapine	Second-line treatment for depression, may be abused for sedative and anxiolytic properties. Causes sexual dysfunction, postural hypotension, increased blood sugar, and sedation.
Risperidone	Has an IM injection that can be given q2weeks to improve compliance. Causes hyperprolactinemia and sexual dysfunction.
Paliperidone	Metabolite of risperidone, renal dose adjustments required, can be given IM q4weeks and q3months. Causes hyperprolactinemia.
Asenapine	BID dosing, should not eat or drink for minimum 10 minutes after administration, may have an unpleasant taste or cause tongue numbness/tingling. Causes QTc prolongation
Aripiprazole	No efficacy past 30 mg/daily, available as IM q4weeks. Well tolerated
Ziprasidone	BID dosing, give with food (minimum 500 calories), weight gain neutral, baseline QTc needed and stop medication if QTc > 500 msec
Lurasidone	Used for depressive episodes of bipolar disorder, give with food (minimum 350 calories), weight gain neutral. Well tolerated.
Olanzapine	Very sedating, increase blood sugar, increase lipids, sexual dysfunction, and negative metabolic effects. Available in short acting IM injection and oral dissolvable tab, large weight gain associated
Clozapine	Therapeutic superiority; however, only used for treatment resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, orthostatic hypotension, and seizures. Requires regular blood testing.

First-generation antipsychotics are all equally effective. Mid-potency antipsychotics such as loxapine, perphenazine, or zuclopentixol should be used.

Women with schizophrenia who are pregnant have an increased risk of stillbirth, infant death, prematurity, and infant being small for gestational age. The risks and benefits of antipsychotics need to be evaluated during pregnancy. There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

Neuroleptic malignant syndrome (NMS) can occur with any antipsychotic. Symptoms of NMS include high fever, confusion, rigid muscle, sweating, and increased heart rate. Some symptoms can improve within 7 days such as agitation, hostility, combativeness, anxiety, and disrupted sleep; however, overall symptom improvement can take 4-6 weeks.

#### RATIONALE:

Correct Answer:

**(Option #3):** An EKG is suggested to be completed prior to starting ziprasidone so a baseline QTc can be measured.

Incorrect Answers:

**(Option #1):** A vision test does not need to be done prior to starting ziprasidone.

**(Option #2):** A chest x-ray does not need to be done prior to starting ziprasidone.

**(Option #4):** A glucose tolerance test does not need to be done prior to starting ziprasidone.

#### TAKEAWAY/KEY POINTS:

A baseline QTc is suggested prior to starting ziprasidone and ziprasidone should be stopped if the QTc > 500 msec during treatment.

#### REFERENCE:

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

[3] Procyshyn RM, Bezchlibnyk-Butler KZ, Jeffries JJ (eds). Clinical Handbook of Psychotropic Drugs, 22nd Edition. Hogrefe Publishing, Toronto, 2017.

[4] Remington G, Addington D, Honer W, Ismail Z, Raedler T, Teehan M. Guidelines for the Pharmacotherapy of Schizophrenia in Adults. *Can J Psychiatry*. 2017;62(9):604-616. doi:10.1177/070674317720448

The correct answer is: Electrocardiogram (ECG)

#### Question 5

ID: 38048

Correct

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**Five weeks later, RS has stopped using cocaine and has been compliant with ziprasidone. RS has not noticed any improvement in his symptoms while taking ziprasidone and wants to switch to another agent.**

What is the most appropriate next step that you would recommend to RS?

Select one:

- Stop ziprasidone and start risperidone ✗
- Cross taper ziprasidone with aripiprazole ✓
- Cross taper ziprasidone with clozapine ✗
- Add quetiapine to ziprasidone ✗

Rose Wang (ID:113212) this answer is correct. The most appropriate step after failing an atypical antipsychotic trial is to cross-taper onto another antipsychotic.

**Correct**

Marks for this submission: 1.00/1.00.

#### TOPIC:

Schizophrenia

#### LEARNING OBJECTIVE:

To understand the medications used for the treatment of schizophrenia.

#### BACKGROUND:

The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross-taper should be used. If there is an incomplete response then combination therapy can be considered. If treatment is resistant, then clozapine monotherapy can be considered. Therapy should be considered for at least 18 months post-remission or 2-5 years/lifelong therapy if there are multiple episodes.

## Pharmacological Treatments of Schizophrenia

Antipsychotic	Comments
Quetiapine	Second-line treatment for depression, may be abused for sedative and anxiolytic properties. Causes sexual dysfunction, postural hypotension, increased blood sugar, and sedation.
Risperidone	Has an IM injection that can be given q2weeks to improve compliance. Causes hyperprolactinemia and sexual dysfunction.
Paliperidone	Metabolite of risperidone, renal dose adjustments required, can be given IM q4weeks and q3months. Causes hyperprolactinemia.
Asenapine	BID dosing, should not eat or drink for minimum 10 minutes after administration, may have an unpleasant taste or cause tongue numbness/tingling. Causes QTc prolongation
Aripiprazole	No efficacy past 30 mg/daily, available as IM q4weeks. Well tolerated
Ziprasidone	BID dosing, give with food (minimum 500 calories), weight gain neutral, baseline QTc needed and stop medication is QTc > 500 msec
Lurasidone	Used for depressive episodes of bipolar disorder, give with food (minimum 350 calories), weight gain neutral. Well tolerated.
Olanzapine	Very sedating, increase blood sugar, increase lipids, sexual dysfunction, and negative metabolic effects. Available in short acting IM injection and oral dissolvable tab, large weight gain associated
Clozapine	Therapeutic superiority; however, only used for treatment resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, orthostatic hypotension, and seizures. Requires regular blood testing.

First-generation antipsychotics are all equally effective. Mid-potency antipsychotics such as loxapine, perphenazine, or zuclopentixol should be used.

Women with schizophrenia who are pregnant have an increased risk of stillbirth, infant death, prematurity, and infant being small for gestational age. The risks and benefits of antipsychotics need to be evaluated during pregnancy. There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

Neuroleptic malignant syndrome can occur with any antipsychotic. Symptoms of NMS include high fever, confusion, rigid muscle, sweating, and increased heart rate. Some symptoms can improve within 7 days such as agitation, hostility, combativeness, anxiety, and disrupted sleep; however, overall symptom improvement can take 4 - 6 weeks.

#### RATIONALE:

*Correct Answer:*

**(Option #2):** The most appropriate step after failing an atypical antipsychotic trial is to cross-taper onto another antipsychotic.

*Incorrect Answers:*

**(Option #1):** RS should be tapered off ziprasidone as opposed to stopping it cold turkey.

**(Option #3):** The most appropriate step after failing an atypical antipsychotic trial is to cross-taper onto another antipsychotic. Clozapine is reserved for treatment-resistant schizophrenia.

**(Option #4):** Adding quetiapine to ziprasidone is not recommended since RS did not notice any symptom improvement with ziprasidone.

#### TAKEAWAY/KEY POINTS:

The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross taper should be used. If there is an incomplete response then combination therapy can be considered.

#### REFERENCE:

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

[3] Procyshyn RM, Bezchlibnyk-Butler KZ, Jeffries JJ (eds). Clinical Handbook of Psychotropic Drugs, 22nd Edition. Hogrefe Publishing, Toronto, 2017.

[4] Remington G, Addington D, Honer W, Ismail Z, Raedler T, Teehan M. Guidelines for the Pharmacotherapy of Schizophrenia in Adults. *Can J Psychiatry*. 2017;62(9):604-616. doi:10.1177/070674317720448

The correct answer is: Cross taper ziprasidone with aripiprazole

ID: 38047

Incorrect

[Flag question](#)[Send Feedback](#)**symptoms. RS wants to know how long he should remain on aripiprazole.**

What is the suggested minimum duration of therapy of aripiprazole for RS?

Select one:

6 months X

18 months ✓

6 years X

Indefinitely X

Rose Wang (ID:113212) this answer is incorrect. RS should remain on aripiprazole for a minimum of 18 months after remission started since this is his first schizophrenic episode.

**Incorrect**

Marks for this submission: 0.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To understand the duration of therapy for schizophrenia treatment.

**BACKGROUND:**

Schizophrenia symptoms include positive and negative symptoms as well as cognitive and mood symptoms.

## Symptoms of Schizophrenia

Positive Symptoms	Negative Symptoms	Cognitive Symptoms	Mood Symptoms
<ul style="list-style-type: none"> <li>• Delusions</li> <li>• Hallucinations</li> <li>• Disorganization of speech, behavior, and thought</li> </ul>	<ul style="list-style-type: none"> <li>• Affective flattening</li> <li>• Apathy</li> <li>• Alogia</li> <li>• Anhedonia</li> <li>• Avolition</li> </ul>	<ul style="list-style-type: none"> <li>• Impaired attention</li> <li>• Impaired working memory</li> <li>• Impaired executive function</li> </ul>	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Anxiety</li> <li>• Aggression/hostility</li> <li>• Suicidality</li> </ul>

The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross-taper should be used. If there is an incomplete response then combination therapy can be considered. If treatment is resistant, then clozapine monotherapy can be considered. Therapy should be considered for at least 18 months post-remission or 2-5 years/lifelong therapy if there are multiple episodes or concomitant substance abuse.

## Pharmacological Treatments of Schizophrenia

Antipsychotic	Comments
Quetiapine	Second-line treatment for depression may be abused for sedative and anxiolytic properties. Causes sexual dysfunction, postural hypotension, increased blood sugar, and sedation.
Risperidone	Has an IM injection that can be given q2weeks to improve compliance. Causes hyperprolactinemia and sexual dysfunction.
Paliperidone	A metabolite of risperidone, renal dose adjustments required, can be given IM q4weeks and q3months. Causes hyperprolactinemia.
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Olanzapine	Very sedating, increase blood sugar, increase lipids, sexual dysfunction, and negative metabolic effects. Available in short-acting IM injection and oral dissolvable tab, large weight gain associated

Therapeutic superiority, however, only used for treatment-resistant

**Clozapine** Therapeutic superiority, however, only used for treatment-resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, orthostatic hypotension, and seizures. Requires regular blood testing.

First-generation antipsychotics are all equally effective. Mid-potency antipsychotics such as loxapine, perphenazine, or zuclopentixol should be used.

Women with schizophrenia who are pregnant have an increased risk of stillbirth, infant death, prematurity, and infant being small for gestational age. The risks and benefits of antipsychotics need to be evaluated during pregnancy. There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

Neuroleptic malignant syndrome can occur with any antipsychotic. Symptoms of NMS include high fever, confusion, rigid muscle, sweating, and increased heart rate.

Some symptoms of schizophrenia can improve within 7 days such as agitation, hostility, combativeness, anxiety, and disrupted sleep; however, overall symptom improvement can take 4-6 weeks.

#### RATIONALE:

Correct Answer:

**(Option #2):** RS should remain on aripiprazole for a minimum of 18 months after remission started since this is his first schizophrenic episode.

Incorrect Answers:

**(Option #1):** RS should remain on aripiprazole for a minimum of 18 months after remission started since this is his first schizophrenic episode.

**(Option #3):** RS should remain on aripiprazole for a minimum of 18 months after remission started since this is his first schizophrenic episode.

**(Option #4):** Indefinite therapy should be considered if the patient has had multiple schizophrenic episodes.

#### TAKEAWAY/KEY POINTS:

Therapy should be considered for a minimum of 18 months after remission started after a first schizophrenia episode or for 2-5 years/lifelong therapy if there have been multiple schizophrenic episodes or concomitant substance abuse.

#### REFERENCE:

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

[3] Procyshyn RM, Bechlibnyk-Butler KZ, Jeffries JJ (eds). Clinical Handbook of Psychotropic Drugs, 22nd Edition. Hogrefe Publishing, Toronto, 2017.

[4] Remington G, Addington D, Honer W, Ismail Z, Raedler T, Teehan M. Guidelines for the Pharmacotherapy of Schizophrenia in Adults. *Can J Psychiatry*. 2017;62(9):604-616. doi:10.1177/070674317720448

The correct answer is: 18 months

#### Question 7

ID: 38049

Correct

Flag question

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**FM is a 42-year-old female who has just been diagnosed with schizophrenia and will be starting on an antipsychotic. Her medical history includes hypertension, diabetes, dyslipidemia, hypothyroidism, and perimenopause. Her current medications are valsartan 80 mg PO daily, hydrochlorothiazide 25 mg PO daily, metformin 1000 mg PO BID, atorvastatin 40 mg PO daily, levothyroxine 125 mcg PO daily, and 17-beta estradiol 10 mcg inserted intravaginally twice weekly. FM's family physician recently increased her atorvastatin dose from 20 mg to 40 mg daily two weeks ago because of her elevated lipid levels. FM has heard that certain antipsychotics may increase cholesterol levels and would prefer to avoid any medication that may do this.**

Which antipsychotic would you recommend to FM that is **LEAST** likely to worsen her dyslipidemia?

Select one:

- Clozapine ✕
- Quetiapine ✕
- Lurasidone ✓
- Olanzapine ✕

Rose Wang (ID:113212) this answer is correct. Lurasidone causes a lower incidence of dyslipidemia.

**Correct**

Marks for this submission: 1.00/1.00.

#### TOPIC:

Schizophrenia

#### LEARNING OBJECTIVE:

To recognize the side effects of schizophrenia treatment.

#### BACKGROUND:

Schizophrenia symptoms include positive and negative symptoms as well as cognitive and mood symptoms.

## Symptoms of Schizophrenia

Positive Symptoms	Negative Symptoms	Cognitive Symptoms	Mood Symptoms
<ul style="list-style-type: none"> <li>• Delusions</li> <li>• Hallucinations</li> <li>• Disorganization of speech, behavior, and thought</li> </ul>	<ul style="list-style-type: none"> <li>• Affective flattening</li> <li>• Apathy</li> <li>• Alogia</li> <li>• Anhedonia</li> <li>• Avolition</li> </ul>	<ul style="list-style-type: none"> <li>• Impaired attention</li> <li>• Impaired working memory</li> <li>• Impaired executive function</li> </ul>	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Anxiety</li> <li>• Aggression/hostility</li> <li>• Suicidality</li> </ul>

The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross-taper should be used. If there is an incomplete response then combination therapy can be considered. If treatment is resistant, then clozapine monotherapy can be considered. Therapy should be considered for at least 18 months post-remission or 2-5 years/lifelong therapy if there are multiple episodes.

## Pharmacological Treatments of Schizophrenia

Antipsychotic	Comments
Quetiapine	Second-line treatment for depression may be abused for sedative and anxiolytic properties. Causes weight gain, sexual dysfunction, postural hypotension, increased blood sugar, increased lipids, and sedation.
Risperidone	Has an IM injection that can be given q2weeks to improve compliance. Causes hyperprolactinemia and sexual dysfunction.
Paliperidone	A metabolite of risperidone, renal dose adjustments required, can be given IM q4weeks and q3months. Causes hyperprolactinemia.
Asenapine	BID dosing, should not eat or drink for a minimum of 10 minutes after administration, may have an unpleasant taste or cause tongue numbness/tingling. Causes QTc prolongation
Aripiprazole	No efficacy past 30 mg/daily, available as IM q4weeks. Well tolerated
Ziprasidone	BID dosing, give with food (minimum 500 calories), weight gain neutral, baseline QTc needed and stop medication is QTc > 500 msec
Lurasidone	Used for depressive episodes of bipolar disorder, give with food (minimum 350 calories), weight gain neutral. Well tolerated.
Olanzapine	Very sedating, increase blood sugar, increase lipids, sexual dysfunction, and negative metabolic effects. Available in short-acting IM injection and oral dissolvable tab, large weight gain associated
Clozapine	Therapeutic superiority; however, only used for treatment-resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, orthostatic hypotension, and seizures. Requires regular blood testing.

First-generation antipsychotics are all equally effective. Mid-potency antipsychotics such as loxapine, perphenazine, or zuclopentixol should be used.

Women with schizophrenia who are pregnant have an increased risk of stillbirth, infant death, prematurity, and infant being small for gestational age. The risks and benefits of antipsychotics need to be evaluated during pregnancy. There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

Neuroleptic malignant syndrome can occur with any antipsychotic. Symptoms of NMS include high fever, confusion, rigid muscle, sweating, and increased heart rate.

Some symptoms of schizophrenia can improve within 7 days such as agitation, hostility, combativeness, anxiety, and disrupted sleep; however, overall symptom improvement can take 4-6 weeks.

### RATIONALE:

*Correct Answer:*

**(Option #3):** Lurasidone causes a lower incidence of dyslipidemia.

*Incorrect Answers:*

**(Option #1):** Clozapine causes a higher incidence of dyslipidemia.

**(Option #2):** Quetiapine causes a higher incidence of dyslipidemia.

**(Option #4):** Olanzapine causes a higher incidence of dyslipidemia.

### TAKEAWAY/KEY POINTS:

Clozapine, quetiapine, and olanzapine are known to cause a higher incidence of dyslipidemia compared to lurasidone.

### REFERENCE:

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington VA American Psychiatric Association 2013

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The correct answer is: Lurasidone

**Question 8**

ID: 38108

Correct

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SP is a 27-year-old female who has been diagnosed with schizophrenia. SP was started on aripiprazole 10 mg PO daily and titrated to a target dose of 30 mg PO daily. She was on this dose for 6 weeks but did not experience any improvement in her symptoms. Her physician then tapered her off of aripiprazole at the same time as starting her on olanzapine 5 mg PO daily. Her olanzapine was increased to a target dose of 20 mg PO daily for 6 weeks, however, she still did not achieve remission of her symptoms. At this point, her physician has decided to taper her off of olanzapine and start her on clozapine for treatment-resistant schizophrenia. He asks you to counsel the patient on the potential side effects that this medication can cause.

What is a potential side effect of clozapine that SP should be counselled on?

Select one:

- Weight loss ✕
- Hyperprolactinemia ✕
- Agranulocytosis ✓
- Sexual dysfunction ✕

Rose Wang (ID:113212) this answer is correct. Agranulocytosis is a side effect of clozapine that requires blood monitoring.

**Correct**

Marks for this submission: 1.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To recognize the side effects of clozapine.

**BACKGROUND:**

Schizophrenia symptoms include positive and negative symptoms as well as cognitive and mood symptoms. The treatment of schizophrenia includes starting antipsychotic monotherapy except for clozapine. If there is inadequate or no response to the first antipsychotic then switch to another antipsychotic except for clozapine. When switching between two antipsychotics, a cross-taper should be used. If there is an incomplete response then combination therapy can be considered. If treatment is resistant, then clozapine monotherapy can be considered. Therapy should be considered for at least 18 months post-remission or 2-5 years/lifelong therapy if there are multiple episodes.

## Pharmacological Treatments of Schizophrenia

Antipsychotic	Comments
Quetiapine	Second-line treatment for depression may be abused for sedative and anxiolytic properties. Causes sexual dysfunction, postural hypotension, increased blood sugar, and sedation.
Risperidone	Has an IM injection that can be given q2weeks to improve compliance. Causes hyperprolactinemia and sexual dysfunction.
Paliperidone	A metabolite of risperidone, renal dose adjustments required, can be given IM q4weeks and q3months. Causes hyperprolactinemia.
Asenapine	BID dosing, should not eat or drink for a minimum of 10 minutes after administration, may have an unpleasant taste or cause tongue numbness/tingling. Causes QTc prolongation
Aripiprazole	No efficacy past 30 mg/daily, available as IM q4weeks. Well tolerated
Ziprasidone	BID dosing, give with food (minimum 500 calories), weight gain neutral, baseline QTc needed and stop medication is QTc > 500 msec
Lurasidone	Used for depressive episodes of bipolar disorder, give with food (minimum 350 calories), weight gain neutral. Well tolerated.
Olanzapine	Very sedating, increase blood sugar, increase lipids, sexual dysfunction, and negative metabolic effects. Available in short-acting IM injection and oral dissolvable tab, large weight gain associated
Clozapine	Therapeutic superiority; however, only used for treatment-resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, and orthostatic hypotension. Requires regular blood testing.

Some symptoms of schizophrenia can improve within 7 days such as agitation, hostility, combativeness, anxiety, and disrupted sleep; however, overall symptom improvement can take 4-6 weeks.

**RATIONALE:**

Correct Answer:

**(Option #3):** Agranulocytosis is a side effect of clozapine that requires blood monitoring.

*Incorrect Answers:*

**(Option #1):** Clozapine causes weight gain.

**(Option #2):** Hyperprolactinemia is not a common side effect of clozapine.

**(Option #4):** Sexual dysfunction is not a common side effect of clozapine.

**TAKEAWAY/KEY POINTS:**

Clozapine is only used for treatment-resistant schizophrenia due to severe side effects including agranulocytosis, myocarditis, weight gain, increased blood sugar, dyslipidemia, sedation, seizures, anticholinergic, and orthostatic hypotension.

**REFERENCE:**

[1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

[2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

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The correct answer is: Agranulocytosis

**Question 9**

ID: 38051

Correct

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**JP** is a 23-year-old male with a diagnosis of schizophrenia. He was started on aripiprazole 10 mg PO daily and increased rapidly to a dose of 30 mg PO daily over the span of three days. JP still did not achieve symptom remission and his physician decided to add lurasidone to his existing aripiprazole therapy. Since the addition of lurasidone, JP has been having symptoms including high fever, rigidity, sweating, and an increased heart rate. He has no other medical conditions nor does he take any other medications. He does not drink alcohol or take any recreational drugs. He had an allergic rash to sulfamethoxazole-trimethoprim a few months ago when it was prescribed to him for a urinary tract infection. He presented to the emergency department and was admitted to the hospital as an inpatient.

Why might JP be experiencing these symptoms?

Select one:

- JP is likely experiencing serotonin syndrome ✗
- JP is likely experiencing neuroleptic malignant syndrome ✓
- JP is likely experiencing malignant hyperthermia ✗
- JP is likely experiencing encephalitis ✗

Rose Wang (ID:113212) this answer is correct. Antipsychotics can cause neuroleptic malignant syndrome.

**Correct**

Marks for this submission: 1.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

To recognize the symptoms of neuroleptic malignant syndrome (NMS).

**BACKGROUND:**

Neuroleptic malignant syndrome (NMS) is a rare, life-threatening side effect that is associated mostly with first-generation antipsychotics but can occur with all antipsychotics. It can appear at any dose and at any time during treatment. Symptoms include fever, changes in mental status, rigidity, increased creatinine kinase, increased WBC counts, fluctuating consciousness, and autonomic dysfunction. Risk factors for NMS include high doses, rapid dose escalation, parenteral administration, multiple concurrent antipsychotic use, dehydration, male sex, young age, and previous history of NMS. The antipsychotic should be discontinued and supportive care should be initiated (i.e., fluid hydration and benzodiazepines). Dantrolene, bromocriptine, and amantadine have been shown to improve symptoms and have shown to reduce mortality rates. Patients should be monitored for 2 weeks before restarting any antipsychotic and ideally, a different agent should be used, with preference given to second-generation antipsychotics.

**RATIONALE:**

*Correct Answer:*

**(Option #2):** Antipsychotics can cause neuroleptic malignant syndrome.

*Incorrect Answers:*

**(Option #1):** Antipsychotics cause neuroleptic malignant syndrome, not serotonin syndrome.

**(Option #3):** Antipsychotics can cause neuroleptic malignant syndrome. Hyperthermia is a symptom of this, but he is experiencing other symptoms too.

**(Option #4):** Antipsychotics can cause neuroleptic malignant syndrome.

**TAKEAWAY/KEY POINTS:**

Neuroleptic malignant syndrome (NMS) can occur with any antipsychotic at any dose at any time during treatment. Symptoms of NMS include high fever, confusion, muscle rigidity, sweating, and increased heart rate.

**REFERENCE:**

- [1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.
- [2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.
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The correct answer is: JP is likely experiencing neuroleptic malignant syndrome

**Question 10**

ID: 21921

Correct

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**WY is a 32-year-old female that has been taking risperidone 2.5 mg PO BID which has kept her schizophrenia in remission for the last three years. Prior to starting on risperidone, WY had experienced multiple episodes of schizophrenia and her physician decided to treat her with lifelong risperidone therapy. Throughout her treatment, WY has not experienced any adverse effects secondary to risperidone. WY just found out that she is 9 weeks pregnant and is wondering if it is safe to take risperidone during pregnancy.**

What is the most appropriate response to WY regarding remaining on risperidone during pregnancy?

Select one:

- WY should stop risperidone because it is not safe during pregnancy
- WY should remain on risperidone since it is safe during pregnancy
- WY should switch from risperidone to aripiprazole
- WY should weigh the potential risks and benefits of remaining on risperidone during pregnancy

Rose Wang (ID: 113212) this answer is correct. The risks and benefits of antipsychotics need to be evaluated during pregnancy.

**Correct**

Marks for this submission: 1.00/1.00.

**TOPIC:**

Schizophrenia

**LEARNING OBJECTIVE:**

Understand the treatment of schizophrenia in pregnancy.

**BACKGROUND:**

Antipsychotic-induced hyperprolactinemia has resulted in lower fertility rates in women with schizophrenia. The risk and benefit of antipsychotic use in pregnancy should be evaluated. Untreated psychosis risks include stillbirth, infant death, and premature birth. Antipsychotics should be maintained at the lowest effective dose. Haloperidol is the most studied first-generation antipsychotic in pregnancy and has been linked with an increased risk of preterm birth. All second-generation antipsychotics cross the blood-placenta barrier. The most evidence for safety with second-generation antipsychotics is with olanzapine, quetiapine, and risperidone. If an antipsychotic is discontinued during pregnancy, it should be restarted as soon as possible postpartum to reduce the risk of relapse. In breastfeeding mothers, olanzapine is the preferred drug. Breastfeeding is not recommended with clozapine due to the risk of neutropenia and seizures in the newborn. In general, antipsychotics pass into breast milk; therefore, breastfeeding may not be recommended and should be considered on a case-by-case basis.

**RATIONALE:**

Correct Answer:

**(Option #4):** The risks and benefits of antipsychotics need to be evaluated during pregnancy.

Incorrect Answers:

**(Option #1):** There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

**(Option #2):** There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

**(Option #3):** There have not been enough studies to conclude the safety of any antipsychotics in pregnancy.

**TAKEAWAY/KEY POINTS:**

Women with schizophrenia who are pregnant have an increased risk of stillbirth, infant death, prematurity, and infant being small for gestational age. The risks and benefits of antipsychotics need to be evaluated during pregnancy. There have not been enough studies to conclude the safety of antipsychotics in pregnancy.

**REFERENCE:**

- [1] Milliken H. Psychoses. In: Compendium of Therapeutic Choices. Ottawa, ON: Canadian Pharmacists Association. <https://myrxtx.ca>.

- [2] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

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The correct answer is: WY should weigh the potential risks and benefits of remaining on risperidone during pregnancy

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